REMARKS/ARGUMENTS

Claims 1-8 and 13-20 are pending. Claims 1-8 are withdrawn. Claims 13-20 stand rejected under 35 U.S.C. 102(b) as being anticipated by *IBM Technical Disclosure Bulletin*. Reconsideration and withdrawal of the rejections is respectfully requested.

The present invention relates generally to a method for analyzing airflow and air distribution with a laboratory safety enclosure. The method is particularly well suited for analyzing airflow and air distribution within a laboratory fume hood.

In use, the present method generates a graphic visualization of air flow and air distribution within a laboratory safety enclosure, such as a laboratory fume hood. The visualization is evaluated to determine the dimensions and locations of air deflection elements that will direct airflow in such a way as to substantially reduce air turbulence within the laboratory safety enclosure, thereby helping contain contaminates inside the laboratory safety enclosure.

The *IBM Technical Disclosure Bulletin* describes a method to realize a localized super-clean zone in down flow-type and tunnel-type clean rooms. The IBM method uses a numerical simulation computer program that solves Navier-Stokes equations to see air flow and distribution of particles around a rectifying board and clean room. The present invention also uses a numerical simulation computer program that solves Navier-Stokes equations. However, the present invention initializes boundary condition inputs that are different in scale and/or opposite in value. For example, the enclosures described in the *IBM Technical Disclosure Bulletin* are relatively large clean rooms in which people work

to fabricate semiconductor devices. In order to prevent contaminant intrusion, the IBM clean rooms rely on maintaining **positive** air pressure inside the clean rooms relative to air pressure outside the clean rooms. As a result of this positive air pressure difference, airflow is urged to flow from the interior of the clean room to the exterior.

In contrast, the laboratory safety enclosures designed using the present method are maintained at a **negative** internal pressure to prevent contaminants from exiting the enclosure. In other words, the airflow direction called for in the present computational model is from exterior to interior. As a result of this difference, the disclosed IBM method is not suitable for designing the type of laboratory safety enclosures realized by the present invention.

<u>The Present Invention Is Novel Over the *IBM Technical Disclosure Bulletin*</u>

As stated in MPEP §2131, a claim is anticipated under §102 only if each and every element as set forth in the claim, in as complete of detail, is found in a single prior art reference. As currently amended, the claimed invention, according to independent claim 13, includes a recitation for a step of defining a computational model that numerically represents the structure of a laboratory safety enclosure including a computational model that numerically represents the structure of an air deflector used to reduce turbulent air flow within the laboratory safety enclosure <u>while the enclosure interior is at a negative air pressure relative to external air pressure</u>. As such, for a cited reference to be anticipatory, the reference must describe this identical step. In other words, to teach in as much detail as is claimed by the present invention, the *IBM Technical Disclosure Bulletin* must

disclose a step of defining a computational model that numerically represents the structure of a laboratory safety enclosure including a computational model that numerically represents the structure of an air deflector used to reduce turbulent air flow within the laboratory safety enclosure <u>while the enclosure interior is at a negative air pressure relative to external air pressure</u>. The steps disclosed in the *IBM Technical Disclosure Bulletin* do not include a step of defining a computational model that takes into account the <u>enclosure's interior negative air pressure relative to external pressure</u>. As a result, the cited method disclosed in the *IBM Technical Disclosure Bulletin* cannot yield the same solution as the present invention. Therefore, the *IBM Technical Disclosure Bulletin* cannot rightfully be deemed to anticipate the claims of the present invention.

<u>The Present Invention Is Not Obvious Over The Cited References</u>

U.S. Patent No. 6,176,368 to Bradbury et al. discloses a system for providing passive dust control for transfer of bulk material from a first station to a second station. A dust containment housing includes a circulation compartment to help prevent dust due to the transfer of bulk material from mixing with external air. A relatively simple set of generalized scalar fluid dynamics equation are analyzed algebraically to generally dimension the dust containment housing.

Quite differently, the present invention incorporates a three-dimensional computational fluid dynamics (CFD) analysis to predict, visualize and optimize airflow velocity and patterns in laboratory fume hoods. Computational fluid dynamics analysis differs greatly from the generalized scalar analysis of algebraic fluid dynamic equations

described in the Bradbury et al. patent. In contrast, computational fluid dynamics involves the application of computationally intensive numerical techniques to solve Navier-Stokes equations for fluid flow. The Navier-Stokes equations are extremely complex and generally yield highly precise airflow velocity and patterns that are comprehended only through graphic visualization. Please see the attached copy of a NASA webpage titled "Navier-Stokes Equations".

On the other hand, the generalized scalar analysis disclosed by Bradbury et al. can be easily calculated with a handheld calculator, but is far less precise than the results obtained by CFD. Moreover, the Bradbury et al. design steps begin with determining frictional losses of airflow induced by material traveling along a conveyor belt followed by steps that conclude with the dimensioning of an air circulation compartment designed to limit the amount of dust released in a workplace.

In contrast, the method of the present invention begins with a step of defining a computational model that numerically represents the structure of a laboratory safety enclosure followed by steps that solve computational fluid dynamic equations and displays a graphical representation of the results, which is then inspected to modify the structure of the enclosure. Neither the *IBM Technical Disclosure Bulletin*, nor the Bradbury et al. patent teach or suggest alone or in combination a step of <u>defining a computational model that numerically represents the structure of a laboratory safety enclosure including a computational model that numerically represents the structure of an air deflector used to reduce turbulent air flow within the laboratory safety enclosure while</u>

the enclosure interior is at a negative air pressure relative to external air pressure, thereby urging external air to flow into the enclosure interior, wherein the computational models are inputs into computational resources usable to solve a set of computational fluid dynamics equations. Accordingly, in the absence of such motivation, suggestion or teaching, the claimed invention cannot be rightfully held to be obvious to one skilled in the art.

In view of the foregoing amendments and for the above reasons, it is now believed that the current application is in condition for allowance. If unresolved issues remain, the Examiner is invited to telephone applicant's agent at the number below.

Respectfully submitted.

William J. Mason
Registration No. 22,948
(910) 256-3557

Date: June 10, 2004
File No. 5011-016A

0